DOCUMENT RESUME

ED 421 617 CE 076 759

TITLE	Educating Tomorrow's Workforce: A Report on the Semiconductor Industry's Commitment to Youth in K-12.
INSTITUTION	Semiconductor Industry Association, San Jose, CA.
PUB DATE	1998-06-00
NOTE	35p.
AVAILABLE FROM	Semiconductor Industry Association, 181 Metro Drive, Suite 450, San Jose, CA 95110 ($10).
PUB TYPE	Reports - General (140)
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	Demonstration Programs; *Education Work Relationship; Educational Improvement; *Electronics Industry; Elementary Secondary Education; *Manufacturing Industry; *School Business Relationship; *Semiconductor Devices

ABSTRACT

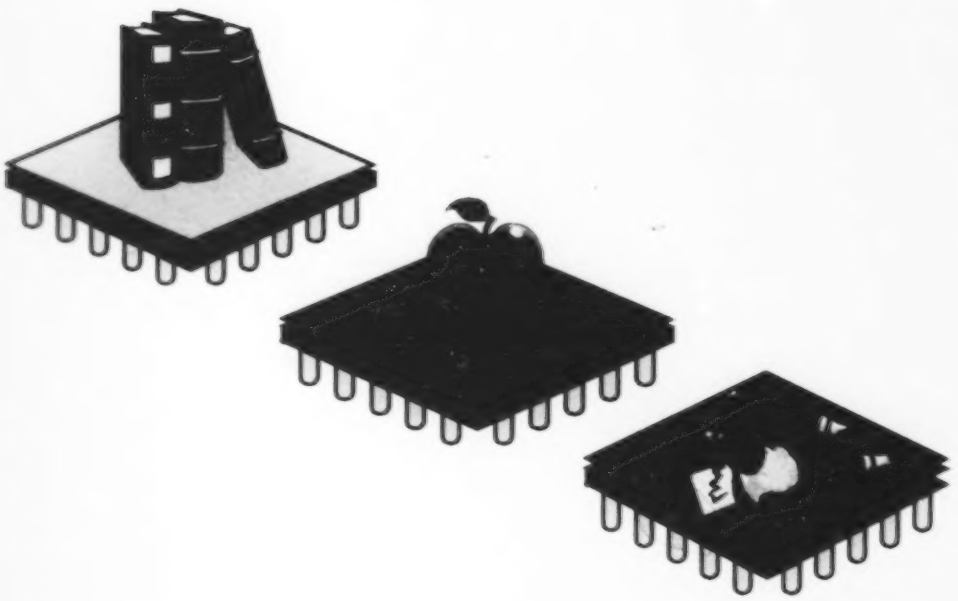
The U.S. semiconductor industry, now the nation's largest manufacturing industry, displays its commitment to training its current workers and educating future workers by supporting educational efforts on the K-12 level. This catalog describes innovative actions by 16 Semiconductor Industry Association companies to improve education at the K-12 level. Examples of these programs include the following: an integrated classroom and internship program; involvement in developing state workplace skills standards; support of Public Broadcasting System television series; and an international science and engineering fair. Projects from the following companies are profiled: Advanced Micro Devices, Analog Devices, Harris, Hewlett-Packard, Intel, IBM, LSI Logic, Lucent Technologies, Micron Technology, Motorola, National Semiconductor, Rockwell Semiconductor, SEMATECH, Semiconductor Research Corporation, Texas Instruments, and VLSI Technology. An appendix describes the work of the Maricopa Advanced Technology Education Center, founded to promote the development of a world class semiconductor manufacturing work force. (KC)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 421 617

Educating Tomorrow's Workforce:

A Report on the Semiconductor Industry's Commitment to Youth in K-12



U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
This document has been reproduced as received from the person or organization originating it.
Minor changes have been made to improve reproduction quality.
Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

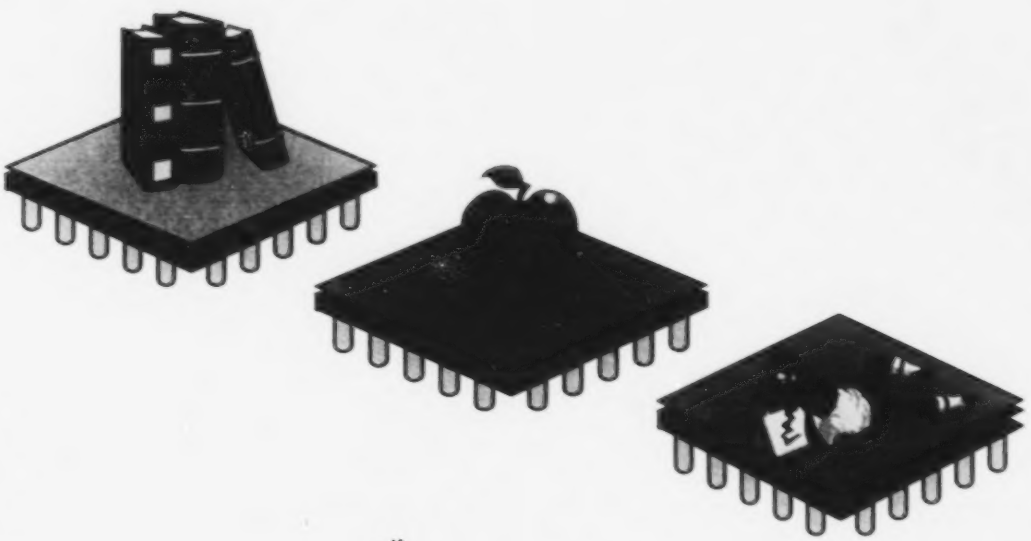
CE076759

Semiconductor Industry Association
June 1998

D Hutano

Educating Tomorrow's Workforce:

A Report on the Semiconductor Industry's Commitment to Youth in K-12



Semiconductor Industry Association
June 1998

Educating Tomorrow's Workforce:

A Report on the Semiconductor Industry's Commitment to Youth in K-12

Semiconductor Industry Association
181 Metro Drive, Suite 450
San Jose, CA 95110
June 1998

Table of Contents

Preface	1
Advanced Micro Devices	3
Analog Devices	4
Harris	4
Hewlett-Packard	4
Intel	6
IBM	9
LSI Logic	12
Lucent Technologies	14
Micron Technology	16
Motorola	18
National Semiconductor	21
Rockwell Semiconductor	23
SEMATECH	24
Semiconductor Research Corporation	25
Texas Instruments	26
VLSI Technology	27
Appendix: Maricopa Advanced Technology Education Center	28

Educating Tomorrow's Workforce: A Report on the Semiconductor Industry's Commitment to Youth in K-12

Preface

The U.S. semiconductor industry is committed to training its current workers and educating America's future workers. Semiconductors are now America's largest manufacturing industry – contributing 20 percent more to the U.S. economy than the next leading industry. The chip industry has moved from the 17th largest industry, measured in economic value added, to first place over the past ten years. This growth is a result of the industry's rapid pace of technological progress – with a constant fourfold increase in the capabilities of a semiconductor chip every three years. The industry's technological progress, in turn, is a result of the ingenuity of the industry's 260,000 employees.

Knowing that today's students are tomorrow's industry contributors, the industry has initiated several educational programs. Since its founding in 1982, the industry's Semiconductor Research Corporation has invested over $350 million at over 70 U.S. and Canadian universities in semiconductor related research. In addition to producing breakthrough research, the funds provided from SRC member companies have strengthened university engineering departments and supported students who often work at SRC member companies after they graduate. In 1996, SEMATECH initiated a partnership with America's community colleges which is expected to triple the number of students educated to be semiconductor technicians. These graduates qualify for high paying jobs – semiconductor production workers earn over 30 percent more than other production workers.

Of course, supporting community colleges and universities with semiconductor technology programs will not result in more graduates if there are not enough qualified students to fill these programs. That is why the SIA Board of Directors' new industry-wide program on workforce and education includes a focus on K-12.

One of the first outputs of this effort is this catalog of innovative actions by SIA companies to improve education at the K-12 level. The purpose of this catalog is to allow SIA companies to learn best practices from their colleagues, and transfer this knowledge to their

own communities. The breadth of semiconductor companies activities in support of K-12 is impressive. Some of the activities are local -- such as AMD's integrated classroom/internship program in Austin; some are at the state level -- such as Motorola's involvement in developing Arizona's Workplace Skills Standards; some are nationwide in scope -- such as Texas Instruments' support of the PBS television series to excite students about math; and some are international -- such as Intel's International Science and Engineering Fair drawing contestants from 25 countries.

Leveraging technology is often part of the chip companies' contribution, such as National Semiconductors special website to teach teachers about the internet. While much of the effort is focused on math and science education, the range of activities also includes Micron Technology's distribution of materials on literacy in the workplace, and IBM's leadership to bring business executives and the nation's governors together to work to improve academic standards. A number of the programs are multi-million dollar commitments, such as HP's initiative to create university partnerships with nearby K-12 schools to engage women and minority students in math an science from the time they enter kindergarten until they finish college.

Because this report is intended to share best practices, actions that are common to most of the companies – such as scholarship programs – were often not included in the catalog even though they are substantial. Another caveat is that, in many cases, SIA only surveyed the semiconductor divisions of the larger companies such as Motorola or Rockwell. Thus while the catalog is by no means comprehensive, it hopefully is nonetheless a good reflection of the tremendous commitment the chip industry is making to improve the education of America's children.

Advanced Micro Devices

AMD allocates approximately half of its corporate contributions budget to education programs. The company sets aside 1 percent of pre-tax profits annually for charitable contributions. In 1997 AMD gave over $600,000 to K-14 education programs in the communities surrounding its major domestic sites. AMD also donated more than $700,000 to engineering programs in universities throughout the United States.

K-12 efforts include grants to local schools for special programs and school partnerships. AMD has established partnerships with several schools to support student success by focusing on four areas: self-esteem and skills development, school-to-work transition, teacher development, and learning readiness. These comprehensive partnerships in Sunnyvale, California and Austin, Texas have reached thousands of children with enhanced curriculum and programs to enable their success.

One school partnership evolved to incorporate the entire neighboring community. AMD's partnership with Columbia Middle School in Sunnyvale grew into a wider coalition involving the school, local government, the school district, AMD and local nonprofit service providers. AMD was an initial partner (1995) in the Columbia Neighborhood Center (CNC) helping to build a neighborhood gymnasium and service center to provide education, recreation, health and social services to neighbors. AMD sponsors after school recreation and educational programs, tutoring, gang prevention, conflict resolution and teacher development programs at the Center. AMD's volunteers work in this partner school and serve as e-mail mentors. As a result of the CNC programs, student attendance has improved by 40 percent, juvenile crime in the neighborhood has decreased by 5 percent below the city average, and student learning outcomes have improved.

Another success is the "Accelerated Careers in Electronics (ACE)" program in Austin which combines high school and junior college classes with paid internships at AMD. This education program is targeted directly at building a qualified local workforce. In addition to enhancing the curriculum for Austin high school students, the ACE program provides direct experience and training in the semiconductor industry. The program acts as a feeder into the Semiconductor Manufacturing Program at Austin Community College, and has had over 160 students enrolled since its kick off in 1995. For more information, contact Betsy Doss, Manager of Corporate Community Affairs, AMD; betsy.doss@amd.com.

Analog Devices

Analog Devices has provided support to the Future Scientists and Engineers of America Program for the past several years. Analog grants support students' projects and Analog engineers work directly with students on the completion of their projects.

Analog also recently agreed to participate in the Retirees Enhancing Science Education Through Experiments and Demonstrations (RESEED)Program. In addition to Analog's financial support of this program, Analog engineers spend at least one hour per week in the classroom for a semester giving practical guidance to students while exposing them to leading edge engineering technologies and products.

Analog also provides financial support to local school systems in those areas of the country where its major facilities are located such as Norwood and Wilmington, Massachusetts; Greensboro, North Carolina; and Santa Clara and Sunnyvale, California.

Harris Corp.

Harris Corp. has an active business-school partnership program which includes 12 junior high schools and 6 high schools in Brevard county, Florida. The partnerships include tours/ workshops for teachers, career shadowing experiences, part time employment for students enrolled in diversified cooperative training, equipment donations, and classroom presentations by industry experts.

Hewlett Packard

HP gives $55 million each year to education, with about $8 million to K-12. HP's K-12 goals are to improve science and math achievement, increase the number of females and minorities in science and math, and ensuring that all children are ready to learn when they start school.

As of 1998, HP's "Hands-on Science" grants have reached more than 16,000 teachers and more than 350,000 K-6 students in nine states (California, Colorado, Delaware, Georgia, Idaho, Massachusetts, Oregon, Texas, Washington)

HP's formal release-time policy allows employees to volunteer four hours per month of paid company time in HP sponsored school partnerships. More than 3,500 employees have taken advantage of this program. HP also has a well developed "mentors" program which uses e-mail to match employees with 1000 students annually from across the country.

In 1997 HP employees and the company together donated more than $2 million in products to more than 400 K-12 schools. Employees contribute 25 percent of the list price and HP absorbs the remaining 75 percent.

One particularly - unique HP initiative is creating university partnerships with nearby K-12 school districts to engage women and minorities students in math and science from the time they enter kindergarten until the time they graduate from college. Currently this $4 million program supports four partnerships centered around UCLA, San Jose State University, Northeastern University, and the University of Texas at El Paso.

For more information on HP's K-12 programs see: http://www.hp.com/go/k12

Intel

Grants

Intel's corporate contributions support national programs for science and engineering education, technology awareness, and the entry of women and minorities into the fields of science and engineering. Activities include scholarships and fellowships, grants to education organizations, science & technology summer camps for local community educators, a math program with Junior Achievement, and a Boys and Girls Club computer education program.

Also of particular note:

- Intel supports several public television programs focused on science. Intel funds 150,000 teacher guides (one for every fourth grade teacher in America) for the Emmy award-winning "Bill Nye the Science Guy" public television show. Intel grants also support "Breakthroughs," a PBS program featuring people of color in science, and "Discovering Women," a PBS program on women in science

- The Intel International Science and Engineering Fair draws high school students from all 50 states and more than 25 countries to compete in 15 scientific categories. The grand prize is a trip to attend the Nobel Award ceremonies in Stockholm, Sweden. The 1998 event will be held in Fort Worth, Texas, from May 10 - 16.

- To encourage the use of PC's in the classroom, in 1997/98 Intel will contribute 100,000 microprocessors to schools. To be eligible, schools must have the other components needed to build completed systems, and provide teacher training.

- Intel donates new equipment to targeted local schools, with an emphasis on education in math, science, and technology. The program emphasizes teacher training to ensure that technology is successfully integrated into the curriculum.

- Intel is the primary sponsor of Students Recycling Used Technology (StRUT), a school-based program that encourages donations of used PCs to participating schools. Students then "recycle" these components by building refurbished computers that are donated to schools. In Oregon alone, a minimum of 10,000 PCs will be refurbished during the 1997-98 school year, resulting in $5.25 million in computer equipment being donated to Oregon schools. In 1997, Intel helped to replicate the StRUT Program in five Western states.

- Intel's Innovations in Teaching Awards Program honors K-12 school teachers near Intel facilities who have developed effective methods for teaching math, science, or technology, and encourages the replication of those innovative teaching methods.

- In 1997, Intel was in the third year of its unique initiative to promote Native American students' interest in math and technology. Intel joined with the American Indian Science and Engineering Society (AISES) and Indian schools in New Mexico and Arizona to establish technology centers. Intel equipped the centers with PCs; funded curriculum development; supported teacher training; and funded a college success program.

Employee Involvement

Through the Volunteer Matching Grant Program, when Intel employees donate 100 hours voluntary time in an academic year, $500 is donated to the school. For each 20 hours donated thereafter in the same academic year, the school earns an additional $100.

Intel's MentorNet offers an e-mail network connecting women science and engineering students with corporate mentors

IDEA Program

The Intel Digital Education and Arts (IDEA) Program presents information to educators on what electronic technology is and how it works. The IDEA Program currently includes three major activities:

- To de-mystify computers and teach the science behind computer and microprocessor technology to middle school students, Intel developed a free classroom kit, which includes a 340 page teacher's guide, teacher's instruction video, and hands-on chip kit with an actual silicon wafer and microprocessor. To date, more than 65,000 teachers have received these free kits.

- Intel's PC Dads are two real "PC-hip" dads from Intel who travel around the country making appearances on TV and radio to help parents and children reap the rewards of becoming computer savvy. More information is available about this program at www.intel.com/intel/educate/pcdads or on their America Online site using the key word "PCDADS."

- The Teachers Corner Web has information on the technology industry, and lessons that can be applied in the classroom. The web site provides career information by profiling Intel employees and what they do in their daily jobs, and includes a page called "How Microprocessors Work."

http://www.intel.com/intel/educate/index/htm.
http://www.intel.com/intel/community/index.htm.

IBM

IBM's commitment to education is demonstrated through a wide range of initiatives designed to improve America's public schools.

Reinventing Education

The Reinventing Education grant program forms the centerpiece of IBM's efforts in K-12 education. through Reinventing Education, IBM is contributing $35 million to 16 school districts and six states that are interested in using technology to spur and support their reform efforts.

In each grant site, IBM is working in partnership with school staff to develop and implement cutting-edge technologies designed to solve some of education's toughest challenges. Speech-recognition, focused Internet efforts, image processing, data warehousing and mining - technologies still new to business - are being customized by award-winning IBM researchers to address specific problems faced by schools, such as the length and structure of the school day and year, how learning is measured, and how language, math and science are taught. Collectively, the projects address nearly every aspect of the education agenda - from home-school communications, to data management and analysis, classroom instruction, teacher training, and student assessment.

IBM began making its first round of ten grants on a staggered basis in 1994. Each of these sites is now using innovative technology solutions to support high academic achievement. Although evaluation of the program is ongoing, the partnerships have already created promising new technologies that are improving teach and learning.

Based on this success, IBM announced 12 new grants through Reinventing Education 2 in October 1997. Through Reinventing Education 2, IBM is building on the knowledge and experience gained through the original efforts by replicating five of the technologies developed through the first program. Now, with 22 Reinventing Education sites, IBM has the potential to make a difference for as many as ten million students, or one in five of the nation's public school children.

1996 National Education Summit

IBM co-hosted the 1996 National Education Summit, along with the National Governors' Association, on March 26-27, at IBM's conference center in Palisades, New York. The Summit was an unprecedented event. Forty-one state governors, 49 business leaders, 34 education resource participants, and President Clinton were in

attendance to focus on their specific responsibilities for improving our nation's schools. Participants engaged in intense discussions on high academic standards, effective assessment systems, and enhanced used of technology in school restructuring. Governors and business leaders also had the opportunity to see and experience demonstrations of the latest in cutting-edge technologies being developed by companies throughout the country, enabling them to understand the link between technology and student achievement. At the conclusion of the Summit, the Governors and business leaders signed a list of specific commitments to improve education, and both groups are now in the process of implementing those commitments with a series of measurable actions.

Achieve, Inc.

IBM continues to ensure progress from the 1996 National Education Summit through its leadership role in Achieve, Inc. Achieve, a nonprofit resource center, was established as a means of assisting governors and business leaders working to raise academic standards, improve assessments, and increase accountability. IBM Chairman and CEO Louis Gerstner, along with Bob Miller, Governor of Nevada, are serving as Achieve Co-Chairpersons.

Achieve is providing national leadership on the issues of high academic standards, assessments, accountability, and effective use of technology to achieve high standards; preparing and making publicly available an annual report that tracks progress made toward achieving the commitments made at the Summit; establishing and managing an electronic clearinghouse of information on academic standards, assessment tools and accountability systems used by various states and countries; providing a benchmarking program to compare standards and assessment tools among states and countries; and delivering technical assistance to states seeking to establish and meet higher academic standards.

IBM Hiring Practices

In addition to work through Achieve, IBM is furthering the commitments from the 1996 National Education Summit through internal efforts. Business leaders attending the Summit agreed to change the way that they hire entry-level workers by implementing hiring practices within one year that would require job applicants to demonstrate specific academic achievement through school-based records such as academic transcripts, diplomas, portfolios, certificates or initial mastery, or others as appropriate. By reviewing the high school performance of job candidates, employers would be

sending a powerful message to students: how and what you do in school will affect your future employment choices.

To fulfill this commitment, IBM developed a new policy that requires all U.S. entry-level manufacturing job applicants to provide information on academic achievement in addition to previous job experiences. IBM manufacturing was identified because of the large proportion of individuals with high school educations that apply for these positions. IBM's leadership on this issue has encouraged over a thousand businesses to follow suit and change their hiring practices, giving students a clearer sense of the skills they need to master in order to increase their chances of finding employment and encouraging them to focus on long-term academic and career goals.

U.S. Olympic PBS Cyber School Powered by IBM

IBM, PBS and CBS teamed up to launch the U.S. Olympic PBS Cyber School Powered by IBM, a comprehensive web site that helps students in the 4th through 8th grades and their parents and teachers combine the 1998 Winter Olympic Games in Nagano, Japan with interactive educational challenges in math, social studies, and science for fourth through eight graders. The Internet site at www.ibm.pbscyberschool.com offers an unprecedented opportunity for parents, teachers and students to collaborate together and build a strong foundation for learning success.

Project FIRST

Project FIRST (Fostering Instructional Reform through Service and Technology), a unique initiative developed through a partnership between IBM and AmeriCorps, is designed to integrate technology into the public school curriculum and increase community involvement using the unique resources and capabilities of local education funds and their business partners. In six cities across the United States - Atlanta, GA; Boston, MA; Charlotte, NC; New York, NY; Oakland, CA; and Worcester, MA - Project FIRST is working towards enhancing technology in the classroom; establishing a committed corps of citizens dedicated to this purpose; and fostering the necessary links between schools and their communities.

Project FIRST coordinates and develops partnerships among the participating local education funds, schools, communities, and local technology corporations to increase their understanding and use of technology, while enhancing teaching and learning. IBM-trained AmeriCorps volunteers are serving as technology coordinators in the public schools.

National Board for Professional Teaching Standards Project

The National Board for Professional Teaching Standards (NBPTS) has the explicit mission of improving the teaching profession as a critical lever to improve student performance. Since its creation in 1987, NBPTS has established high and rigorous teaching standards and has developed a national, voluntary system to assess and certify teachers who meet these standards. As NBPTS engages in a major push to increase the ranks of teachers with national certification, IBM is working with NBPTS to develop and online scoring tool that will improve consistency or scoring teacher portfolios while reducing cost and time requirements that serve as barriers to participation.

IBM K-12 Matching Grants Program

The IBM K-12 Matching Grants program is a special program that enables employees and retirees to contribute selected IBM equipment and software to eligible K-12 schools of their choice by contributing only 20 percent of the retail value, and IBM matches the rest. This program is unique among corporate Matching Grants programs both in its focus on K-12 education and in its grounding in technology. In 1997, IBMers contributed an outstanding $9 million.

For detailed information on IBM's efforts, please visit the IBM Corporate Community Relations web sire at www.ibm.com/ibm/ibmgives.

LSI Logic

LSI Logic's Community Contributions Program focuses its grants on programs which directly benefit students in the communities where company facilities are located. Approximately one-half of the philanthropic budget is allocated for K-12 activities. The program also targets higher education.

In Milpitas, California, where LSI Logic is headquartered, the annual LSI Logic Classic Run has raised $260,000 for the Milpitas Unified School District since 1991. The district has used these funds for several projects including: linking its library system to the larger resources of the Santa Clara County Library, via the Internet; providing students with transportation to off-site educational events and programs; establishing a computer-technology room for students; and developing an instructional-materials center for teachers. Proceeds from the 1998 10K run and 5K walk will be used to equip a new science and math building at Milpitas High School.

In Gresham, Oregon, LSI Logic provides grants to the Centennial, Gresham-Barlow and Reynolds education foundations to improve each district's math, science and technology programs. In one of the districts, the grant was used to purchase essential items like new math and science books, to support the development of a leadership program and to bring email to all kids in the district through a project called Mentor Mail.

LSI Logic has partnered with Gresham's Mt. Hood Community College to fund, develop and implement the college's new Microelectronics Training Center and Associate of Applied Science in Microelectronics degree program. This program extends to the local high schools where students can take courses in electronics and semiconductor manufacturing and receive college credit upon completion.

LSI Logic also provides scholarships to graduating high school seniors as well as students already enrolled in community colleges and universities, including Oregon State University, Portland State University and University of Minnesota.

The company is a national sponsor of the "Expanding Your Horizons" conferences that are designed to encourage middle and high school age girls to consider science and math based careers. Additionally, LSI Logic employees serve as mentors and the company donates surplus computer equipment to local schools.

Politically, LSI Logic has also supported school district efforts to pass bond issues to upgrade existing facilities and to build new classrooms for students. For example, the company contributed funds for Oregon's successful Measure 52, a $150 million bond issue for state schools. LSI Logic also supported a successful bond issue for the Santa Clara Unified School District in 1997. Earlier this year, the company provided funds for a bond issue campaign for the Fremont Unified School District.

Lucent Technologies

The Microelectronics Group of Lucent Technologies has a long-standing commitment to education that pre-dates Lucent's formation two years ago. Today, these programs, small and large, support Lucent's stated values to have a strong sense of social responsibility and help prepare the employees of tomorrow.

While Lucent has a strong focus on college education, it also has developed solid programs to help train and educate children in K-12. These are geared to not only educate, but also to open the eyes of youth to the possibilities that exist.

The Lucent Technologies Foundation includes a corporate contributions program to support philanthropic initiatives that advance education, address the needs of communities where its employees live and work, and encourage employee volunteerism and giving.

One major shift made by Lucent this year was to include K-12 in the Matching Gift program of the Lucent Foundation. As of March, 1998, the Foundation matches one-for-one employees' gifts to qualified elementary, middle and high schools. Eligible institutions include private, public, or independent, elementary, middle and high schools with appropriate regional, state or professional accreditation, and tax-exempt independent educational funds if their sole purpose is to raise money for their constituent K-12 institutions (for example, community education foundations). The maximum gift matched by the Lucent Foundation is $10,000 per employee, per year.

Lucent's philosophy in all programs is to provide not just funding and equipment, but also Lucent people. Lucent employees who volunteer for projects are a key part of the company's effort in the community, including in schools.

There are programs that are the same or similar in all locations, as well as programs specific to each individual location. Some are sponsored by the company through location Community Involvement Councils. Others are sponsored by Employee Business Partner groups within Lucent. In addition, the volunteer Pioneer organization, made up of current and former employees, work on a variety of projects which touch the K-12 students.

Among Lucent's programs:

- Tutoring – Employees from Lucent locations tutor local students, particularly in math and science. These programs are coordinated

by employee volunteers or community organizations such as the Literacy Council.

- Junior Achievement - Each location participates in a different way, some sponsoring local "companies" and others sponsoring programs in the schools. All are designed to teach students about business.
- Equipment Donations - Each of Lucent's locations works with local schools to donate surplus equipment and supplies. Programs are set up in the company's locations to identify surplus equipment and the needs of community organizations and institutions.
- Teacher Internships - Secondary school teachers spend six to eight weeks during the summer at Lucent to learn about the workings and needs of business today. Participation varies from year to year depending on the numbers of teachers available.
- In celebration of "Take Our Daughters To Work Day" each year, Lucent facilities invite daughters -- and sons – of employees in the age category of nine through 15 to learn not only about Lucent facilities and the company's business, but also about the careers available in the semiconductor industry.
- Map Project – Pioneer volunteers paint maps of the United States on the surface of school playgrounds. It's a fun way for students to learn geography.
- Talking Books - The Pioneers create and repair talking books, which help visually impaired students to learn.

Among the projects in which Lucent participate in Reading, PA, are:

- Supporting the Berks Classical Children's Chorus program to further the vocal and musical skills of young people between the age of eight and 18.
- Partnering with the local newspaper to provide newspaper subscriptions to schools and students to help make reading a habit for students.
- sponsoring programs at the Reading Public Museum, including transportation for pupils to go to the museum to experience the exhibits.
- Sponsoring programs with the Reading Symphony Youth Program to bring county elementary students to a special symphony program.
- Sponsoring the STAR Science Teachers Teleconferencing Project which provides secondary science teachers with teleconferencing protocols and distance learning instructional methodologies.
- Touring high school students in specific courses of study.

Among the projects in which Lucent participate in Orlando, where the company is part of a joint venture with Cirrus Logic called Cirent Semiconductor:

- developing a consortium to address critical local, state and national educational issues (K-12 included) through corporate and employee awareness, action and support. All of these programs address the needs of students and educators in Central Florida.

Among the projects in which Lucent participate in Allentown, PA, are:

- A science and technology education center for children called the Discovery Center. The company sponsors various programs such as the Laser and Hologram Show and a Mission to Mars Show. In addition, Lucent has made grants, donated computers, and scheduled Lucent employees as volunteers there.
- sponsoring "the Banana Factory," an art and culture center that also includes the Pennsylvania Youth Theater
- working with the Caring Place, an inner city after-school center, by provided funding, library books, computers, and microscopes.
- sponsoring two local Math Counts competitions.
- supplying equipment and computers to a local junior high school to enable them to connect to the weather station and provide local weather information for a Philadelphia television station.

Micron Technology

Micron has developed a comprehensive K-12 Program with the following goals: Improve language, math, science and technology skills; increase the number of students preparing for and entering technical fields; strengthen work-related attitudes and behaviors of students. Employees are provided four hours of paid time per semester for involvement in approved K-12 activities which include the following:

Grade Level Team Presentations: Micron-developed lesson plans and equipment kits using hands-on activities to teach language, math, science or technology, usually used by a team of employees working with a classroom teacher.

Careers@Micron: An on-site program for 11th and 12th graders interested in technical careers which offers a general introduction to technical careers and the workplace and provides an in-depth job shadowing opportunity. Individual career presentations are provided in the classroom, with flyers, brochures and hands-on product samples provided. Micron's Women in Technical Careers also provides lunch-time career presentations for female students in local high schools. Micron employees are present at nearly every career fair in the area.

Classroom Volunteer: Micron staffs an after-school and summer community education computer lab for elementary students. Individual employees provide supplemental science and math hands-on activities and tutoring.

Students at Micron: Micron sponsors an E-Mail Mentor program matching women in technical careers with 8th grade female students. The programconsistsof6 weeks of e-mail exchanges followed by an an-site meeting, job shadow and hands-on technical demonstrations. Students are also on-site for tours, presentations and Micron annually sponsors Math Counts.

Teachers at Micron: Micron developed a model for teacher workshops which has become a community-based Business-Education Exchange sponsored by School to Work funds. Summer employment has also been provided for teachers and counselors.

Micron developed Writing in the Workplace and Math in the Workplace packets providing workplace examples of the use of writing and math in the plant. These models have led to the development of community-wide packets including math and writing samples from a wide-variety of businesses in the area. These materials are available to math and English teachers.

Micron has made a special effort to make strong links with rural schools, including them in on-site programs, encouraging parents to become involved in the classroom and donating equipment.

While development of company-specific programs has been a high priority, of equal importance has been Micron's role in helping develop a community coalition of schools, businesses, parents and public agencies. State and local School to Work and Workforce Development initiatives have been vehicles for these efforts.

Micron Technology, Inc.'s contributions objective is to support a wide range of projects and programs within the community with primary emphasis on educational programs related to math and science. Toward this end, Micron has regularly supported such programs as Math Counts, Junior Achievement, the Boys and Girls Club, and Hugh O'Brian Youth Leadership through donation of both cash and computer equipment. Micron's division, Crucial Technology, unveiled a "Memory is Crucial" program in the spring of 1997 to supply memory upgrades to schools state-wide. Micron's web page includes guidelines for cash and equipment contributions as well as an on-line application form.

Micron's webpage includes a K-12 Education Outreach section which includes lesson plans, math and writing packets, and how-to information on the E-Mail program and teacher workshops. For additional information contact Alecia Baker at 208 368-5933 or arbaker@micron.com.

Motorola

Each year Motorola invests millions of dollars in education and Motorola employees devote countless hours mentoring, tutoring, teaching, and helping to change the education system. Among the unique Motorola programs are the following:

Motorola has External Education Councils on a corporate level and on the various sector levels, that meet regularly to discuss ways to become catalysts for change within education systems. The Councils' goal is help align the school districts with basic business needs and insure high academic standards for students. Motorola has developed and implemented several programs in order to obtain systemic change within the education system.

One program is the Executive Leadership Institute. This effort is an outgrowth of a business and education partnership which began with the Illinois Principals Association and Motorola, and has expanded to Massachusetts, New Mexico, Arizona and Iowa. The institute allows superintendents, principals and school board members to learn some of Motorola's best business practices.

Motorola has also been very involved in the development of Arizona's Workplace Skills Standards. These standards, which were approved by the State Board of Education in March 1996, can be found at: www.ade.state.az.us/standards/wp.html

Another very effective program is the Teacher Ambassador Program. The nine-month program includes team building, shadowing of Motorola employees and development of projects that the Ambassadors take back to their schools/districts. Ambassadors (teachers) experience first-hand a variety of work from high-tech manufacturing areas to executive offices. The facilities tours give the Ambassadors a sense of what their students will need to succeed in the world of work (after high school). The Ambassador Program began in 1991 with 16 educators from the Mesa Arizona Public Schools. Since then 178 educators have participated in this program, including 26 teachers this year.

The "Motorola Apprenticeship Program for Students" or "MAPS" program is a work-study training scheme in which part of the training occurs on the job and part occurs off the job in a classroom setting. MAPS was designed to tackle the problem of hiring an "unskilled" labor force by hiring high school students who would have extensive on-the-job training, educational classes and Motorola mentors. The students "earn while they learn" and get to reap the same benefits as any other Motorola employee, including, paid vacation and holidays, sick days, medical coverage and profit sharing.

Motorola also supports a variety of other K-12 programs, many of which are focused at 15 schools in Phoenix, Mesa, Tempe, Scottsdale and Chandler, Arizona which have been designated official Motorola 'partnership schools.' These programs include:

- The "Future Scientists and Engineers of America" (FSEA) is a national non profit organization which provides the structure, project material, documentation and workshop training necessary to establish after school technology chapters (clubs) in K-12 schools. The program can easily and readily be implemented in any school. FSEA is structured to involve working scientists, engineers, retirees, college students, teachers and parents. Each FSEA chapter consists of a sponsor, company mentors, FSEA student members, a teacher and a parent coordinator. Motorola's goal to have an FSEA Chapter at each of its Partnership schools, and to support each chapter with three Motorola engineers, with at least one being female.

- "Spectacular Science Program" is a set of inquiry based, hands-on, integrated science and math activities . The project is made possible by the joint efforts of Motorola and the nationally recognized AIMS (Activities Integrating Math and Sciences) Education Foundation.

- "IC the Solution" is a Motorola program for 4th, 5th and 6th graders that raises the awareness of employment opportunities in industry for girls and boys.

- "IC the Future" provides students with a chance to view careers associated with current technology. Students are able to participate in an actual manufacturing situation, see the various kinds of products and materials used to integrate circuit engineering and participate in marketing activities.

- "Youth Enrichment in Semiconductors" (YES) is a program that exposes children to real life examples of technology in action, by providing special tours for students to the semiconductor wafer-fabs , resulting in a hands-on experience.

- "Design Day" is a competitive fun filled day for the 7th and 8th graders from Valley High School feeder schools. Students design, engineer and construct their entries.

- "Motorola Guest Teachers" is a program to certify qualified Motorola employees as substitute teachers at Motorola partnership schools in order to provide teachers with release time from the classroom. This allows the regular teachers a chance to pursue professional development opportunities; and students with exposure to a professional with relevant workplace information to share..

- Motorola is active in the "Principal for a Day Program, " a highly acclaimed event that offers business and community leaders the opportunity to observe the operations of a school and the challenges and rewards involved in managing one.

- "KideXecs" individually pairs more than 100 promising 12 and 13 years old children with one of Phoenix's top-level business executives such as the CEO or the owner. The student spends the morning with the executive and then attends a special luncheon at the Arizona Club.

In addition, Motorola employees are allowed to volunteer an hour out of their work week to tutor students in the K-12 arena.

Contact: Diana Bejarano, email: R40772@email.sps.mot.com

National Semiconductor

Studies reveal that over $5 billion was spent in 1997 on technology for U.S. schools. However, less than 15 percent of teachers have received adequate training to use the technology in their classrooms, and 80 percent identify lack of training as the main obstacle to Internet use. To help close the gap, National Semiconductor launched a $2.5 million program to train and encourage teachers to use the Internet in the classroom. The initiative has three components:

- Global Connections: a leader-led training program that provides teachers with the knowledge, skills and support necessary to integrate the Internet into their curriculum.
- Global Connections Online: a free, Web-based training program teachers may access anytime, anywhere. It contains 30-minute modules including Internet Basics, Developing an Internet-Rich Lesson Plan and Designing and Building a Web Page. Log onto www.nsglobalonline.com to view the course.
- Internet Innovator Awards: an awards program to recognize and reward educators who are using the Internet effectively to enhance their lesson plans. National will provide over $1 million in awards to teachers in California, Maine and Texas where National has major manufacturing sites.

For more information about National's Internet Training Initiative, visit www.national.com/training.

In addition to its efforts to encourage Internet use in the classroom, National has a variety of programs to support education in the communities where its employees work and live. Examples of these programs are as follows:

California

National Semiconductor has established formal partnerships with Santa Clara Unified, Sunnyvale School Districts and Fremont Union High School District. The company has also instituted corporate release time policies encouraging employees to volunteer in local schools. National Semiconductor serves as a corporate sponsor of educational events such as Santa Clara Unified's Summer Science Academy, Sunnyvale's Dare to Care Education Fair, Electronic Learning Fair, Smart Valley ,s Leaders Online Conference and the Santa Clara County Office of Education's Technology Institute. The company collects, refurbishes and contributes all surplus computer equipment to schools and supports education reform efforts such as Joint Venture Silicon Valley Challenge 2000 that helps teams of schools make significant changes in education.

Maine

National Semiconductor partners with University of Maine and Maine's Technical College system to help develop curriculum to provide meaningful opportunities for individuals interested in technical careers. The firm annually sponsors the Maine State Science and Technology Fair and provides volunteers and judges for exhibits focusing on biology, chemistry, physics, psychology and technology. The company also participates in the University of Southern Maine's U.S. First Robotic Competition, teaming a group of National's engineers and South Portland high school students to create a remote controlled robot and sponsors Camp Kieve, a science camp for girls in grades 5-7.

Texas

National Semiconductor formed a partnership with Mansfield Independent School District and Tarrant County Junior College (TCJC) to jointly develop and implement a Semiconductor Manufacturing Technology program for high school and junior college students. The company also provides scholarships for students to attend Expanding Horizons in Math and Science, a career day seminar. The firm sponsors the Fort Worth regional Science Fair. Provides funding for Expanding Your Horizons, supporting the career fair that encourages 7th and 8th grade girls to pursue careers in science and math. National employees volunteer in the Arlington Scholars program working with 8th grade students stressing the importance of choosing challenging high school courses to encourage college preparedness.

For more information about National Semiconductor's community relations programs, visit www.national.com/community.

Rockwell Semiconductor

Rockwell contributes to a variety of women and minority engineering societies, at the national and local levels. In one program, scholarships are provided for at risk teens - e.g. kids who have had drug & alcohol addiction problems, may have been abused, and without financial support & scholarships have little chance to go to college. Job Shadow Days or tours at various Rockwell sites gives students valuable insights about the semiconductor products that Rockwell produces and an idea of the variety of jobs that exist in the industry.

Rockwell is also active in the "Soar with Science" fair sponsored by the Ventura County School District, sponsors teachers to attend a week long summer Space Camp to develop creative math/science curriculum, is contributing to the construction of the Hands On Science Museum which is being built in Thousand Oaks, California, and provides internship opportunities for Grossmont Lantrack students (students are focused on Local Area Network technology and are being rehabilitated in a career transition program usually due to a personal injury).

SEMATECH

SEMATECH has been sponsoring a nation-wide program "Partnering for Workforce Development" which focuses on increasing the pool of qualified workers for the semiconductor industry. As a result, 3 full-time employees have been dedicated to the program over a 12 month period to build industry/education partnerships at the K-14 levels, which would result in a significant enrollment of students to semiconductor manufacturing degree programs. To aid with the enrollment increases, SEMATECH invested $750,000 on a marketing campaign (targeted at potential students of high school age and above) to increase the awareness of opportunities in the semiconductor industry.

The Chief Administrative Executive of SEMATECH is co-chairing an industry-led advisory council made up of top-level executives in the Austin area, to focus on K-12 initiatives which would lead to a skilled, qualified workforce for the semiconductor industry. An inventory of all of the K-12 activities have been cataloged, and will be assessed for the best leveraging of available resources

$100,000 plus in-kind contributions have been earmarked to fund personnel to manage an industry-led central Texas semiconductor and electronics education/ workforce development system (ACE 2000 project), starting Spring 1998.

SEMATECH has adopted Allison Elementary and Del Valle Junior High schools. Within a strong mentorship program employees volunteer approximately 1000 hours each year to mentor and tutor students from these schools. Additionally, $6,000 is donated to the schools to apply towards their "wish lists"; $3000 Science grant is awarded each year to Del Valle Junior High to promote math and science; and additional support is given to the schools by donating computers to the high school computer lab and to the junior high school teachers

SEMATECH employees actively participate on Board memberships (Tech-Prep; School-To-Work; Workforce Development Councils and Adopt-a-School) and are instrumental in guiding K-12 programs. In addition, there is active participation in career awareness and exploration as: classroom speakers; curriculum designers; Engineers participating in Engineers week as speakers; plant tours for faculty, counselors and K-12 students; and take your daughters and sons to work day.

Semiconductor Research Corporation

The SRC consortium is an affiliate of SIA which grants $28 million a year, funded by its member companies, to universities performing research on semiconductor topics. The SRC also has provided a small grant for three years to Harding University High School's FIRST team. FIRST, which stands "For Inspiration and Recognition of Science and Technology," is best known for its annual robot competition. Harding is a science and technology magnet school in Charlotte, North Carolina.

The FIRST Competition is a national engineering contest which immerses high school students in the exciting world of engineering. Teaming up with engineers from businesses and universities, students get a hands-on, inside look at the engineering profession. In six intense weeks, students and engineers work together to brainstorm, design, construct and test their "champion robot". With only six weeks, all jobs are on the critical path. The teams compete in a spirited, no-holds barred tournament complete with referees, cheerleaders and time clock hosted by EPCOT in Orlando, FL., the sports analogy is purposeful, and encouraged, according to FIRST officials.

Each year's competition is different, so returning teams always have a new challenge to anticipate. FIRST has grown from 28 teams at one site in 1992 to several regional competitions and 199 teams entered in the 1998 national competition. FIRST has expanded its initiatives to include middle school students in its Junior Robotics Competitions, which use LEGO MINDSTORM systems.

Several companies in the semiconductor industry sponsor individual FIRST teams throughout the country, including; Applied Materials, Eastman Kodak, Fairchild Semiconductor, Ford, Harris, Hitachi, Honeywell, Hughes, Lucent Technologies, Motorola, National Semiconductor and Raytheon.

FIRST is a nonprofit organization, located in Manchester, NH, whose mission is to generate an interest in science and engineering among today's youth. See FIRST's web site for more information: http://www.usfirst.org.

Texas Instruments

TI's K-12 effort begins "Pre-K" with joint programs with Head Start to develop a model preschool program. These programs benefit almost 200 disadvantaged children annually.

TI also shares its "quality management" skills with local schools. Nationwide, TI quality awareness workshops have reached more than 1,100 educators since 1992. TI volunteers have also worked with the principal from Frazier Elementary in inner-city Dallas to develop an Academic Improvement Management software, a tool which helped that schools earn a recognition as one of the districts most improved site in terms of test scores.

As a result of a $3 million grant from the TI foundation, science and technology comes alive for thousands of K-12 students visiting the TI Founders IMAX Theater at The Science Place in Fair Park.

TI also worked with educators to develop and produce a 12-page, four color booklet, "Uncovering Math with Your Family." The booklet targets elementary-aged children, and is a resource for parents to use for ideas on how to highlight mathematical concepts as they apply to day-to-day living. Adding up the groceries when at the store, discussing fractions while eating slices of pizza, and looking for number patterns in addresses are a few activities suggested.

TI has partnered with the National Science Foundation (NSF) to support its major investment in systemic reform of math and science education for higher student achievement. As the leading source of corporate support for the NSF's funded systemic initiatives, TI sponsors the Urban Systemic Initiatives (USI)/Comprehensive Partnership for Mathematics & Science (CPMSA) Coalition, assists with the integration of learning technologies identified by the NSF and co-sponsors, along with the NSF, appropriate leadership development activities tied to the USI and CPMSA systemic reforms.

Since 1993, TI engineers have been helping students put their competitive spirit to work in a robotics competition called Texas BEST (Boosting Engineering, Science & Technology). Each year, this high profile statewide event attracts entries from more than 80 schools (high schools)...more than 1300 students took part in the 1995 event.

TI is national sponsor of MATHCOUNTS, an exciting competition that gives thousands of 7th & 8th grade students a chance to race against the clock to solve challenging math problems. TI provides

major funding...and supplies over 900 TI scientific calculators annually for local, state, and national competitions.

The Dallas Women's Foundation has received TI grants totaling $240,000 for the 1996-2001 period. These grants are for math, science and technology programs that address the needs of women and girls.

TI is the exclusive corporate sponsor of "Life By The Numbers," a television special airing on the Public Broadcasting Service in April 1998. The series, hosted by actor Danny Glover, demonstrates the ubiquity of mathematics in work, sports, exploration, and nature. TI is hopeful that the show will positively influence the way kids think about math. The last segment of the seven part series examines new approaches toward teaching mathematics. To encourage the widest possible usage of the programs, teachers have been granted six-year, off-air taping rights for use in the classroom. More information on "Life By The Numbers," including specific details on each show, can be found at www..ti.com/calc/mathlife.

VLSI Technology

VLSI Technology participates in a number of programs aimed at children in grades K-12, with a particular focus on science and engineering education at schools and organizations near its key sites around the world.

In Silicon Valley, VLSI Technology contributes to the Valley Scholars program, which targets promising high school students and supports them with a mentoring and scholarship program to help increase their educational skills. VLSI also supports San Jose's Tech Museum and Children's Discovery Museum.

Among its Arizona activities, VLSI Technology finances of three scholarships for graduating students of the Tempe, Arizona Union High School District.

Appendix
MATEC -- a government-industry-school partnership for semiconductor education.

MATEC

A number of the SIA member companies and SEMATECH have been supporters of the Maricopa, Maricopa Advanced Technology Education Center (MATEC). This Center is funded by a grant from the National Science Foundation's Advanced Technology Education program to promote the development of a world class semiconductor manufacturing work force. While most of MATEC's activities are at the community college level, it is beginning to develop materials to assist teachers at the 6-12 levels.

"A Fab Way to Work" is a MATEC video which demonstrates the relevancy of science classroom lessons to typical semiconductor manufacturing problems. It also raises students awareness of career opportunities in semiconductors. The video, which has won awards from the International Video Television Association, can be ordered for $25 through the MATEC website.

MATEC is currently developing a 6-12 Curriculum Kit. This summer, science teachers, multimedia specialists, and a counselor will be working to enhance the components of this kit. The kit will be beta tested at several national sites before its release.

MATEC and the Portland Community College will cosponsor the fourth annual conference on semiconductor technology education in August in Portland, Oregon. The conference, which includes workshops on K-12 education, provides college and high school teachers with an opportunity to learn and share how physics, chemistry, and math can be taught in the semiconductor manufacturing context. Last year's conference attracted over 180 registrants from 50 educational institutions and companies.

Industry's support for MATEC has included cost sharing for specific projects (Motorola paid for half of the cost of the "A Fab Way to Work" video) and advisory support. Motorola and Intel have loaned executives who spend part of their time at the MATEC office. The MATEC advisory board includes representatives from AMD, IBM, Johnson Controls and SGS-Thompson as well as SEMI/SEMATECH. The MATEC staff development and curriculum design committee contains additional members from Rockwell, Digital, and Semiconductor Systems. As MATEC has worked with its community

college partners around the country, semiconductor companies in those regions have donated time and money towards making the regional roll-outs a success. This has included company sponsorship of K-12 teachers to attend the annual education conferences and of distribution to local schools of the "A Fab Way to Work" videos mentioned above.

MATEC can be contacted at:

2323 W. 14th St., Suite 402
Tempe, AZ 85281
http://matec.org
e-mail: matec@maricopa.edu
phone:1-602-517-8650
fax: 1-602-517-8669

The Semiconductor Industry Association

The Semiconductor Industry Association (SIA) represents U.S-based semiconductor manufacturers. Semiconductors are now America's largest manufacturing industry -- contributing 20 percent more to the U.S. economy than the next leading industry.

Given the global nature of the semiconductor industry (overseas sales account for roughly half of the U.S. industry's revenues) and the various obstacles to free trade that have surfaced, the SIA's major emphasis has been to open markets and promote technology development. The association's primary focus on trade issues is to challenge unfair trade practices, eliminate tariffs on U.S. semiconductors, and create equal access for American semiconductor products in world markets.

In the U.S., the SIA is also concerned with fostering a domestic economic climate that complements the needs of the highly competitive and capital-intenstive semiconductor industry. Recently, the SIA began a major initiative to assist the industry in developing its workforce through a newly created Semiconductor Workforce Strategy Committee.

To accomplish its goals, the SIA coordinates a broad spectrum of industry programs and activities: development of a national semiconductor technology strategy, government procurement programs, and occupational health, safety and environmental initiatives. The SIA also distributes industry statistics, sponsors conferences and publishes studies.

Semiconductor Industry Association
181 Metro Drive, Suite 450
San Jose, CA 95110
TEL: (408) 436-6600 FAX: (408) 436-6646
www.semichips.org

For information about this catalog,
please contact Daryl Hatano at dhatano_sia@ibm.net
or Cathleen Barton at cbarton_sia@ibm.net